

## Claims

- [c1] 1.A switching-mode power converter comprising:  
input and output circuits;  
a transformer having primary and secondary windings respectively coupled to said input and output circuits, said secondary winding includes first and second end terminals;  
first and second switching circuits respectively coupled to said first and second end terminals of said secondary winding; and  
first and second complementary control circuits respectively disposed to drive said first and second switching circuits.
- [c2] 2.The switching-mode power converter as set forth in claim 1 wherein said secondary winding further including a mid terminal disposed between said first and second end terminals, said converter further including a filter circuit connected to said mid terminal of said secondary winding.
- [c3] 3. The switching-mode power converter as set forth in claim 2 where said filter circuit includes an inductor having one end connected to a capacitor and another end connected to said mid terminal of said secondary winding.
- [c4] 4.The switching-mode power converter as set forth in claim 1 wherein said first complementary control circuit being disposed between said first end terminal of said secondary winding and said first switching circuit, and said second complementary circuit being disposed between said second end terminal of said secondary winding and said second switching circuit.
- [c5] 5.The switching-mode power converter as set forth in claim 1 wherein said input circuit includes third and fourth switching circuits coupled thereto, wherein said first complementary control circuit being disposed between said first and third switching circuits, and said secondary complementary control circuit being disposed between said second and fourth switching circuits.
- [c6] 6.A switching-mode power converter comprising:  
input and output circuits;  
a transformer having primary and secondary windings respectively coupled to

said input and output circuits, said secondary winding includes end terminals and a mid terminal;

first and second switching circuits, each of said switching circuits having one end coupled to one of said end terminals of said secondary winding and the other end connected to a common node;

a filter circuit disposed between said mid terminal of said secondary winding and said common node; and

first and second complementary control circuits respectively disposed to drive said first and second switching circuits.

[c7] 7.The switching-mode power converter as set forth in claim 6 wherein said first complementary control circuit being disposed between one of said end terminals of said secondary winding and said first switching circuit, and said second complementary circuit being disposed between the other of said end terminals of said secondary winding and said second switching circuit.

[c8] 8.The switching-mode power converter as set forth in claim 7 wherein each of said complementary control circuits includes a NOR circuit having two inputs and an output, wherein one of said inputs being connected to a resistor and diode connected in parallel, and the other of said inputs being coupled to one of said terminals of said secondary winding, said output being disposed to drive one of said switching circuits.

[c9] 9.The switching-mode power converter as set forth in claim 8 wherein each of said complementary control circuits further including an inverter circuit coupled thereto, said inverter circuit being disposed to drive a capacitor which in turn is connected to input of the other of said complementary control circuits.

[c10] 10.The switching-mode power converter as set forth in claim 6 wherein said primary circuit includes third and fourth switching circuits, wherein said first complementary control circuit being disposed between said first and third switching circuits, and said secondary complementary control circuit being disposed between said second and fourth switching circuits.

[c11] 11.The switching-mode power converter as set forth in claim 6 wherein each of

said complementary control circuits includes an inverter circuit.

[c12] 12.The switching-mode power converter as set forth in claim 11 wherein said inverter circuit includes an inverter input, a resistor and a diode connected in parallel disposed at said inverter input, said inverter circuit further including a capacitor disposed at said inverter input.

[c13] 13.The switching-mode power converter as set forth in claim 6 wherein said input and output circuits are full-wave switching circuits.

[c14] 14.The switching-mode power converter as set forth in claim 6 wherein said input circuit is a half-bridge switching circuit and said output circuit is a full-wave switching circuits.

[c15] 15.The switching-mode power converter as set forth in claim 6 wherein said input circuit is a full-bridge switching circuit and said output circuit is a full-wave switching circuit.

[c16] 16.The switching-mode power converter as set forth in claim 6 wherein said output circuit is a current-doubler circuit which further includes first and second windings respectively coupled to said primary and secondary windings, said first and second windings being connected at a common terminal, said filter circuit being disposed between said common terminal and said common node.

[c17] 17.The switching-mode power converter as set forth in claim 6 wherein said switching circuits include field-effect-transistors.

[c18] 18.The switching-mode power converter as set forth in claim 6 wherein said filter circuit includes an inductor and a capacitor connected in series disposed between said mid terminal and said common node.

[c19] 19.A switching-mode power converter comprising:  
input and output circuits;  
a transformer having primary and secondary windings respectively coupled to said input and output circuits, said secondary winding includes first, second and mid terminals;

first and second switching circuits, each of said switching circuits having one end coupled to one of said first and second terminals of said secondary winding and an other end connected to a common node;  
a filter circuit having an inductor and a capacitor connected in series, said inductor being connected to said mid terminal of said secondary winding, and said capacitor being connected to said common node; and  
first and second complementary control circuits respectively disposed to drive said first and second switching circuits.

[c20] 20.The switching-mode power converter as set forth in claim 19 wherein said primary winding includes third and fourth terminals, said input circuit includes third and fourth switching circuits respectively coupled to said third and fourth terminals of said primary winding.

[c21] 21.The switching-mode power converter as set forth in claim 20 wherein said first complementary control circuit being disposed between said first and third switching circuits, and said second complementary control circuit being disposed between said second and fourth switching circuits.

[c22] 22.The switching-mode power converter as set forth in claim 21 wherein each of said complementary control circuits includes an inverter circuit.

[c23] 23.The switching-mode power converter as set forth in claim 22 wherein said inverter circuit includes an inverter input, a resistor and a diode connected in parallel disposed at said inverter input, said inverter circuit further including a capacitor disposed at said inverter input.

[c24] 24.The switching-mode power converter as set forth in claim 19 wherein said first complementary control circuit being disposed between said first terminal of said secondary winding and said first switching circuit, and said second complementary control circuit being disposed between said second terminal of said secondary winding and said second switching circuit.

[c25] 25.The switching-mode power converter as set forth in claim 24 wherein each of said complementary control circuits includes a NOR circuit having two inputs and an output, wherein one of said inputs being connected to a resistor and

diode connected in parallel, and the other of said inputs being connected to one of said terminals of said secondary winding, said output being disposed to drive one of said switching circuits, each of said complementary control circuits further including an inverter circuit coupled thereto, said inverter circuit being disposed to drive another capacitor which in turn is connected to the input of the other of said complementary control circuits.

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